9/15/14- Objective:
Students will understand and apply the Intermediate Value Theorem.

Do Now: Discuss your answers to the "We Belong Together" Lab sheet (page 2) which you completed for homework.

Agenda:

1.) Do Now: Discuss "We Belong Together"
2.) Test Topics
3.) The Intermediate Value Theorem
4.) Application: The Bisection Method
5.) Hand Back Problem Set #1
6.) Summary

Topics on Test #1:

1.) Evaluating Limits Graphically
2.) Evaluating Limits Numerically
3.) Evaluating Limits Algebraically
4.) Limits to Infinity / asymptotes
5.) Definition of continuity at a point
6.) Intermediate Value Theorem

2 sections - Section #1 will be non-Calculator
- Section#2 will be Calculator active

The Intermediate Value Theorem (IVT):

Common Sense Version:

If a function is continuous, then when you go from one point to another you will hit every y-value in between.

The Intermediate Value Theorem (IVT):

More Formal Version:

THEOREM 1 Intermediate Value Theorem If $f(x)$ is continuous on a closed interval $[a, b]$ and $f(a) \neq f(b)$, then for every value M between $f(a)$ and $f(b)$, there exists at least one value $c \in (a, b)$ such that $f(c) = M$.

The Intermediate Value Theorem (IVT):

Use the IVT to show that the function $f(x) = \dfrac{x}{x+1}$

takes on the value 0.499 for some x value on the interval [0 , 1].

The Intermediate Value Theorem (IVT):

The BIG consequence of the IVT is that when a continuous function changes sign, it MUST hit zero in between. This idea is very important in calculus.

Application: The Bisection Method

Approximate the zero of the function $f(x) = x^3 - 8x - 1$ on the interval [2 , 3]

Interval [a , b]	Midpoint of Interval	f(a)	f(x) @ Mdpt	f(b)	Conclusion

Group Practice:

Use 2 iterations of the Bisection Method to approximate the zero of the function $f(x) = x^4 - 3x^3 - 7x + 5$ on the interval [0 , 1].

Summary: State the "IVT" in your own words.

Homework: Prepare for the Test (tomorrow and Wednesday)